REMARKS

Claims 1-15 have been examined. Applicants are canceling claim 15. Applicants are adding new claims 16-22. Claims 1-14 and 16-22 are all the claims pending in the application.

Objection to the Specification

The Examiner has objected to the specification for the reasons set forth on page 2, paragraphs 1 and 3 of the Office action. Applicants extend appreciation to the Examiner for his attention to detail. However, Applicants respectfully disagree that all alleged defects in Applicants' specification rise to the level of warranting an objection.

Notwithstanding, in the interest of expediency, Applicants have amended the specification in a manner that addresses the issues raised in the Office action. Accordingly, Applicants respectfully request that the objection to Applicants' specification be withdrawn.

Objection to Drawings

The Examiner has objected to Applicants' drawings under 37 C.F.R. § 1.83(a) as allegedly not showing every feature of the invention specified in claims 9 and 12. Applicants are submitting corrected drawings for the Examiner's review and approval. Figure 8 corresponds to the features recited in claim 9. Figure 3, items 23 and 24 represent the remotely controllable servomechanism of claim 12.

Not described

Rejection of Claims 1-15 Under 35 U.S.C. §112, First Paragraph

The Examiner has rejected claims 1-15 under 35 U.S.C. § 112, first paragraph, as allegedly containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, to make and/or use the invention.

In regard to claims 1 and 5 "the computer optimization means," Applicants respectfully disagree that the specification fails to adequately describe this aspect of the invention. As discussed at page 5 of the specification, for a five-segment-four-gap slider element, the equivalent circuit is a series connection of nine transmission line segments. It is simply necessary to conduct known and routine circuit analysis to determine what lengths of the nine transmission line segments will yield the desired phase shift while minimizing aggregate signal reflection. There is nothing difficult about this, and the present specification notes that this can be done using "known commercially available radio frequency circuit analysis and optimisation software." For example, it is known how to calculate the amount of signal reflection that will occur at the interface between two transmission line segments having different characteristic impedances. One skilled in the art then simply needs to add the reflections occurring for radio frequency signals at the interface of each transmission line segment to determine the aggregate signal reflection. A different combination of transmission line segment lengths can be tried which will also yield the desired phase shift, and the aggregate signal reflection of that design can be calculated.

The reason for the computer is not that the calculation of the determination of the phase shift or the calculation of the signal reflection are difficult, but that there are so many

possibilities that it would be tedious and very time consuming for all of the various options to be calculated and then compared to see which one exhibits the least aggregate signal reflection. The computer will simply do it faster. Indeed, U.S. Patent No. 5,905,462 (hereinafter Hampel '462) describes using a simulator (software) to calculate expressions that relate to the thickness and width of a layer of dielectric material and its effect on line impedance. (Col. 9, lines 30-43).

MPEP §2164.01 (Test of Enablement)(8th Edition) states that the test of enablement is whether one reasonably skilled in the art could make or use the invention from the disclosure in the patent coupled with information known in the art, without undue experimentation. In view of the discussion above, it is respectfully submitted that Applicants' specification comports with the requirements of 35 U.S.C. § 112, first paragraph. Accordingly, Applicants respectfully request that the rejection of claims 1-15 under 35 U.S.C. §112, first paragraph, be withdrawn.

phase shift

Rejection of Claims 1-15 Under 35 U.S.C. § 112, Second Paragraph

The Examiner has rejected claims 1-15 under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for the reasons set forth on page 3, lines 13-18 of the Office action.

Applicants have cancelled claim 15, but respectfully traverse the rejection insofar as it applies to the remaining claims.

The scope of the claim is clear to a hypothetical person possessing the ordinary level of skill in the pertinent art. MPEP §2171 (Two Separate Requirements for Claims Under 35 U.S.C. § 112, Second Paragraph)(8th Edition). The phrase "the adjacent transmission line" in

claim 1 does not make the claim unclear since reading claim 1 one sees that the dielectric member is described as being adjacent a transmission line, and it is immediately clear that "said adjacent transmission line" refers to the transmission line to which the dielectric member is adjacent. Similarly, the phrase "said gap" of claim 4 does not render the claim indefinite since reading the claim and/or claims as a whole it is understood with a reasonable degree of certainty that "gaps" or "each said gap" is being claimed.

Definiteness of claim language must be analyzed, not in a vacuum, but in light of: (a) the content of the particular application disclosure; (b) the teachings of the prior art; and (c) the claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made. MPEP §2173.02 (Clarity and Precision)(8th Edition). The scope of invention sought to be patented can be determined from the language of claims 1 and 4 with a reasonable degree of certainty.

Applicants respectfully request that the rejection of claims 1-15 under 35 U.S.C. § 112, second paragraph, be withdrawn.

Notwithstanding, Applicants are amending claims 1 and 4 solely for cosmetic reasons and not for issues of patentability. These amendments are not narrowing and do not change the scope of the original claims.

Rejection of Claims 1-3, 5-8 and 10-15 Over Xu (USP 6,441,700)

The Examiner has rejected claims 1-3, 5-8 and 10-15 under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 6,441,770 B2 (hereinafter Xu). Applicants

respectfully traverse this rejection by application of 35 U.S.C. § 103(c), in that the present invention and that described in Xu were commonly owned at the time the present invention was made. Accordingly, Applicants respectfully request that the rejection of claims 1-3, 5-8 and 10-15 under 35 U.S.C. § 103(a) be withdrawn.

While the rejection should be withdrawn, Applicants will discuss the patentable distinction over Xu for the reason that the identical subject matter would have been disclosed in the published Australian priority documents of Xu and would be prior art under 35 U.S.C. 102(b).

Lines 22-30 of page 2 of the specification point out the earlier Australian application that became USP 6,441,700 (Xu) now cited by the examiner. Xu includes a movable dielectric element where the dielectric is shaped as a plurality of teeth (4, 5), which in accordance with the language of claim 1 of the present application are indeed a plurality of discrete segments movably overlapping the transmission line. However, what is lacking in Xu is any teaching of optimizing the dimensions of each segment and the gaps between them to minimize aggregate reflection. Xu talks about phase shift only.

The graduated and regular shape of the peaks 4, 5 in Xu would actually teach away from the present invention, since the sole function of the graduated peaks in Xu is to gradually increase the lengths of the higher impedance transmission line until a desired phase shift is achieved. The result in Xu will be that all high impedance portions of the transmission line will be of equal length and all lower impedance transmission line sections (those juxtaposed with the

gaps in the dielectric slider) will also be of equal length. Applicants have found this constraint unacceptable.

Further, the phase shifter must be capable of providing an **adjustable** phase shift, and even if by some chance the regular shapes of the peaks in Xu did result in a minimized reflection at a particular phase shift, when the dielectric element is slid to a different position to provide a different phase shift the minimized reflection will likely no longer hold.

Claims 1 and 16 of the present application describe the optimization of the dimensions such that aggregate reflection is minimized whereby the computer optimised interactive dielectric segments are of different shapes from one another. Claim 17 describes the dielectric segments as having leading and trailing edge surfaces and wherein at least one of the leading and trailing edge surfaces of at least one segment is non-linear. Claim 18 recites that leading and trailing edge surfaces of plural dielectric segments are non-linear.

There is simply no suggestion in any of the cited art, and certainly not in Xu, of configuring the dielectric segments in such a way as to satisfy the requirements of these claims. Without any suggestion whatsoever other than in the present application, there is clearly no support for an obviousness rejection. Accordingly, withdrawal of this rejection is respectfully traversed.

Rejection of Claims 1-3, 5-9 and 11-15 Over Hampel (USP 5,905,462)

The Examiner has rejected claims 1-3, 5-9 and 11-15 under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 5,905,462 (hereinafter Hampel '462). Applicants respectfully traverse this rejection.

Aside from any other arguments for distinction, it is clear that Hampel does not teach or suggest an arrangement wherein the discrete dielectric segments are of different shapes as required in claim 1.

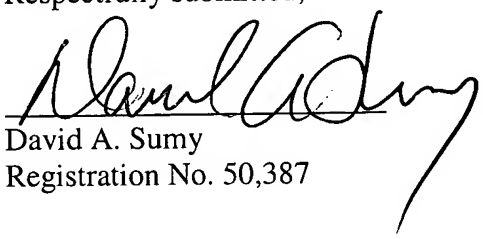
Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned attorney at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any

overpayments to said Deposit Account.

Respectfully submitted,



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Date: April 23, 2003

APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The specification is changed as follows:

Page 3, second full paragraph:

According to the invention there is provided a phase shifter element arranged to selectively vary the effective dielectric constant of a section of transmission line thereby changing the propagation velocity of ~~said~~the transmission line and varying the phase of signals of desired frequencies or frequency range passing through ~~said~~the transmission line ~~said~~the phase shifter element comprising a movable planar dielectric member of predetermined dielectric constant adjacent ~~said~~the transmission line, ~~said~~the planar dielectric member being provided with three or more discrete interactive dielectric segments extending from at least one edge thereof to moveably overlap the adjacent transmission line, where optimum dimensions of each ~~said~~ interactive segment and optimum widths of gaps defined by opposite edges of adjacent segments are determined by computer optimisation means, such that the aggregate reflection of ~~said~~the signals passing through ~~said~~the transmission line is minimised.

On page 4, between lines 16 and 17:

Detailed Description of the Exemplary Embodiments

Page 4, second full paragraph:

Referring to ~~Figures~~Figure 1 ~~and 2~~ of the drawings there is shown a planar dielectric element 1 comprising a rectangular body section 2 (see also Figure 2) and five segments, 3, 4, 5, 6 and 7 extending from a major edge of body section 2. The segments are separated by four air gaps 8, 9, 10 and 11. The segments lie in the same plane as the body section. To improve structural rigidity of the dielectric element, the air gaps may be replaced by a dielectric material of a different dielectric constant to that of the material of the dielectric element 1. Alternately, the air gaps may be replaced by thinner portions of the same material as the dielectric element.

Paragraph bridging page 4 and page 5:

As shown in Figures 3 and 4, dielectric element 1 is slidably mounted and adjacent to the top surface of a PCB distribution element comprising a planar dielectric circuit board 12 supporting a conductive track 13 (see Figure 3) on a first surface 12a thereof. The conductive track and the dielectric circuit board form a transmission line whose distal ends terminate at respective terminals T and B (see Figure 3). The distribution element is supported in a spaced relationship with a conductive ground plane 14. The dielectric circuit board's second surface 12b and the ground plane face one another. Alternately, the second surface of the circuit board and the ground plane can be contiguous (not shown). The movable dielectric element 1 is supported above the first surface 12a of circuit board 12 in a linearly slidable manner by two parallel rods 15, 16 attached to the ground plane. It will be understood that the movable dielectric element 1 will have the effect of varying the phase whether it is adjacent to the first

surface 12a or the second surface 12b (see Figure 4), although the phase shift achieved by each arrangement will be different; the movable dielectric element 1 will have a greater effect when adjacent to the second surface 12b, i.e., interposed between surface 12b and the ground plane 14. Also shown in Figure 4 is segment 4.

Page 6, first full paragraph:

Referring to Figure 6 of the drawings there is shown a second embodiment of the invention for use with a three section antenna array (see Figure 7). This is in contrast to Figure 5 of the drawings which shows a two section antenna array having two terminals T and B and signal input I. The planar dielectric element 17 is provided with segments that extend from opposite major edges of the dielectric element's body section. A movable dielectric element 17 is slidably mounted and adjacent to one surface surface of a planar PCB distribution element 18 that supports two conductive tracks 19 and 20. The conductive tracks and the dielectric circuit board form a transmission network for splitting a radio frequency signal applied to a signal input terminal I (see Figure 7) into three paths that terminate respectively in three terminals T, B and C for feeding to the ~~top~~Top (T), Bottom (B) and Center(C) sections of a three section antenna array (see ~~Fig.~~Figure 7). The distribution element 18 is supported in a space relationship with a conductive ground plane 20; the planar dielectric circuit board's other surface and the ground plane facing one another. The movable dielectric element 17 is supported in a linearly slidable manner by two parallel rods 21 and 22 attached to the ground plane 20.

IN THE CLAIMS:

Claim 15 is canceled.

The claims are amended as follows:

1. (Amended) A phase shifter element arranged to selectively vary the effective dielectric constant of a section of transmission line thereby changing the propagation velocity of said transmission line and varying the phase of signals of desired frequencies or frequency range passing through said transmission line, said phase shifter element comprising a movable planar dielectric member of predetermined dielectric constant adjacent said transmission line, said planar dielectric member being provided with three or more discrete interactive dielectric segments extending from at least one edge thereof to moveably overlap ~~the adjacent~~said transmission line, wherein ~~optimum~~ dimensions of each said interactive segment and ~~optimum~~ widths of gaps defined by opposite edges of adjacent segments are determined by computer optimisation means, such that the aggregate reflection of said signals passing through said transmission line is minimised,

wherein at least two of said interactive segments are shaped differently from one another.

3. (Amended) A phase shifter element as claimed in claim 1, wherein said ~~gap is~~gaps are at least partly filled by material whose dielectric constant is different to that of a dielectric constant of said dielectric segments.

4. (Amended) A phase shifter element as claimed in claim 1, wherein said ~~gap is~~gaps are at least partly filed by the same material as that of the dielectric segments, and wherein the thickness of the filing is less than the thickness of said segments.

Claims 16-22 are added as new claims.